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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/820,047	03/28/2001	Yoshihiko Seyama	3531.65364	3083

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EXAMINER	
CAO, ALLEN T	
ART UNIT	**PAPER NUMBER**
2652	

DATE MAILED: 01/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/820,047	SEYAMA ET AL.	
	Examiner	Art Unit	
	Allen T Cao	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,15 and 16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-8,15 and 16* is/are rejected.

7)☒ Claim(s) *2* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 March 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. Claims 15-16 and 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a) The phrase "... providing a maximum resistance change rate or resistance change amount..." in claim 15, line 6 is vague and indefinite because it lacks metes and bounds of the claimed invention. It is unclear as to what is the "maximum resistance change" or the amount of "resistance change" as claimed.

b) The phrases "current perpendicular to the plane structure" (CPP) in claim 15, line 2 and "in the case of passing a current in an in-plane direction" (CIP) in claim 15, lines 6-7 are contradicted and confusing because how the CPP MR structure including CIP structure as Applicant's claimed language in claim 15 (see also claims 6 and 16).

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 15-16, 1, 3 and 6-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Dykes et al (US. 5,668,688).

Dykes et al (figure 3B) disclose a spin valve magnetoresistive sensor having a first conductor 92; a second conductor 104; and a magnetoresistive film (102) provided between the first and second conductors; wherein the MR film including a free magnetic layer 94 and a pinned magnetic layer 98 as set forth in claims 15 and 16. Hasegawa et

al also inherently disclose that the "magnetoresistive film (claim 15) or free layer or pinned layer (claim 16) has a thickness larger than that providing a maximum resistance change rate or resistance change amount in the case of passing a current in an in-plane direction); see discussion in column 4, lines 10-20 and column 5, line 60 to column 6, line 7. Additionally, Dykes et al inherently disclose that the MR film thickness "larger than" that "providing a maximum resistance change rate" or "resistance change amount" in the case of passing a current in an in-plane direction by Applicant's broadly claimed language as set forth in claims 6, 15 and 16.

Regarding claim 1, Dykes et al (figure 3B) disclose that the magnetoresistive film has the free ferromagnetic layer 94 provided on the first conductor 92; a nonmagnetic intermediate layer (spacer 96) provided on the free layer; the pinned ferromagnetic layer 98 provided on the nonmagnetic intermediate layer 96; and an antiferromagnetic layer (spinning layer 100) provided on the pinned magnetic layer.

Regarding claim 3, Dykes et al disclose that the thickness of the free layer is from 20 – 200 Angstroms which is equal to 2nm to 20nm (claim 20).

Regarding claim 7, Dykes et al disclose that the nonmagnetic intermediate layer made of Cu and has thickness is 10-50 Angstroms which is equal to 1nm – 5nm (claim 38).

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 4-5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dykes et al in view of Gill (US. 6,538,859 B1).

Regarding claims 4 and 5, Dykes et al do not disclose that the pinned magnetic layer has a laminated structure and the free magnetic layer 26 has a laminated structure.

Gill et al disclose a MR sensor having a pinned magnetic structure has laminated ferri layers (622, figure 6) and a free magnetic structure has laminated ferri layer (632, figure 6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the pinned structure and free structure of Dykes et al with a laminated ferri layers structure as set forth, supra as taught by Gill et al.

The rationale is as follows: One of ordinary skill in the art would have been motivated to modify the pinned structure and free structure of Dykes et al with a laminated ferri layers structure as set forth, supra as taught by Gill et al to improve the flux characteristics of the MR film, thus improve read/write characteristics of the MR sensor.

Regarding claim 8, Dykes et al do not disclose that the free layer and the pinned layer are formed of a material selected from the group consisting of Co, CoFe and NiFe.

Gill et al disclose a MR sensor structure having the free ferromagnetic layer and the pinned ferromagnetic layer, both are made of CoFe (column 7, lines 2-3 and 9-10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to manufacture the free layer and the pinned layer of Dykes et al with a CoFe material as taught by Gill et al.

The rationale is as follows: One of ordinary skill in the art would have motivated to make the free layer and the pinned layer of Dykes et al with a CoFe material as taught by Gill et al to improve the flux characteristics of the MR film, thus improve read/write characteristics of the MR sensor. Additionally, it has been held to be within the general skill of a worker in the art to select a known material having different chemical bonding structures on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416 (CCPA 1960).

6. Claim 2 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record neither discloses nor suggests a MR sensor having the combinations all limitations of claims 15 and claim 1 and further limitations of that "the thickness of at least one of said free ferromagnetic layer and said pinned ferromagnetic layer falls in the range of 0.5 to 2.0 times the mean free path of conduction electrons in a spin direction not spin-dependently scattered in a magnetization direction of said at least one layer" as recited in claim 2.

Response to Arguments

8. Applicant's arguments with respect to claims 15-16 and 1-8 have been considered but are moot in view of the new ground(s) of rejection.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Applicant's amendment (the phrase **"including a multiplayer current perpendicular to the plane structure"** in claim 15, lines 1-2) necessitated the new ground(s) of rejection.

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen T Cao whose telephone number is (703) 305-3796. The examiner can normally be reached on Mon-Tues and Weds - Fri (7:30 - 6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Allen Cao
Primary Examiner

AC
January 06, 2005